

Citation:

Lanou AJ, Barnard ND. Dairy and weight loss hypothesis: An evaluation of the clinical trials. *Nutr Rev*. 2008 May; 66(5): 272-279.

PubMed ID: [18454813](#)

Study Design:

Meta-analysis or Systematic Review

Class:

M - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To evaluate the evidence from clinical trials that assessed the effect of dairy product or calcium intake, with or without concomitant energy restriction, on body weight or adiposity.

Inclusion Criteria:

- Studies published on the relationship between milk, dairy products or calcium intake and body weight, body mass index (BMI) or adiposity
- Human studies
- Clinical trials
- Published in English
- Catalogued from 1966 through August 2007.

Exclusion Criteria:

- Reports available only in abstract form
- Reports that did not address change in body weight, BMI or body fat.

Description of Study Protocol:**Recruitment**

- Studies were identified using a MEDLINE search of keywords milk, dairy, calcium and weight, BMI or body fat
- Additional studies were identified from the cited references of articles obtain from MEDLINE and from the National Dairy Council's Website (<http://www.healthyweightwithdairy.com>).

Design

- Clinical trials were categorized based on whether or not they used energy restriction, age group studied, treatment studied (dairy products, calcium supplementation or both)
- Factors such as dosage (dairy product serving or quantity of supplement), duration of study, sample size and effect size were discussed with regard to study quality.

Dietary Intake/Dietary Assessment Methodology

Study was a review of clinical trials that assessed dairy product or calcium supplement intake.

Data Collection Summary:

Dependent Variables

Review abstracted information regarding:

- Change in body fat
- Change in body composition (body fat).

Independent Variables

Review abstracted information regarding the amount of calcium supplementation or dairy product recommended to participants in clinical trial.

Control Variables

- Review considered age of population studied, duration of clinical trial and effect size (amount body weight lost, rate of body weight change, change in adiposity) when evaluating reports. Studies were divided based on age, outcome and concomitant energy restriction and proportion or positive vs. negative findings were discussed
- No formal analytical methods were applied in review of reports.

Description of Actual Data Sample:

- *Initial N*: 49
- *Attrition (final N)*: 49 (the number of studies removed based on exclusion criteria was not reported)
- *Age*:
 - 18 studies examined the effect of dairy products (seven studies) or calcium (11 studies) in the absence of energy restriction in children and adolescents:
 - *Dairy product studies*: Dosage, 330ml to four servings of dairy per day; duration, three months to two years; sample size, 28 to 757
 - *Calcium supplementation studies*: Dosage, 300mg to 1,200mg Ca per day; duration, six months to three years; sample size, 84 to 162
 - 20 studies examined the effect of dairy products (10 studies) or calcium (10 studies) in the absence of energy restriction in adults:
 - *Dairy product studies*: Dosage, metrics used to gauge increases in dairy consumption varied. Reports range of 430mg Ca per day to 1,600mg Ca per day, increases in intake by three servings and increase by 50 g per day of high-Ca, low-fat milk powder; duration, 12 weeks to three years; sample size, 34 to 204.
 - *Calcium supplementation studies*: Dosage, 1,000 to 1,200mg Ca per day;

- duration, four months to seven years; sample size, 37 to 36,282
- 11 studies examined the effect of dairy products or calcium with energy restriction in adults:
 - *Dairy product studies*: Dosage: 500 to 2,400mg Ca per day for reported by Ca amount; two to four servings of dairy for reported as servings; duration, 12 weeks to 48 weeks; sample size, 29 to 72
 - *Calcium supplementation studies*: Dosage, 1,200mg Ca per day to 1g Ca per day; duration, one month to 25 weeks; sample size, 62 to 100
- *Ethnicity*: Review discussed reports from studies performed internationally
- *Other relevant demographics*:
 - Many of the studies reviewed by the authors for the effect of calcium supplementation on body weight in adults seemed focused on women
 - Studies with concomitant energy restriction focused on overweight and obese populations
- *Location*: Included reports from international populations:
 - 18 studies examined the effect of dairy products (seven studies) or calcium (11 studies) in the absence of energy restriction in children and adolescents (United Kingdom, United States, China, Hong Kong, New Zealand, Gambia, Switzerland, Australia, Denmark, United Kingdom)
 - 20 studies examined the effect of dairy products (10 studies) or calcium (10 studies) in the absence of energy restriction in adults (populations reported by Lanou et al: United States, Hong Kong, Spain, New Zealand, Gambia)
 - 11 studies examined the effect of dairy products or calcium with energy restriction in adults (populations reported by Lanou et al: Australia, United States, Canada, Denmark).

Summary of Results:

Study Endpoint	Age Group	Independent Variable	Number of Studies that Supported a Link Between Endpoint and Independent Variable (Association Reported)	Number of Studies that Did Not Support a Link Between Endpoint and Independent Variable (Association Reported)
Weight loss	Children, adolescents	Dairy products (without energy restriction)	Zero	Seven (null effect)
	Children, adolescents	Calcium supplements (without energy restriction)	Zero	11 (null effect)

	Adults	Dairy products (without energy restriction)	Zero	Two (increased body weight with increased dairy) Eight (null effect)
	Adults	Calcium supplements (without energy restriction)	Two (one showed reduction in rate of gain; one showed increased weight loss)	Eight (null effect)
	Adults	Dairy products (with energy restriction)	Three (all showed weight loss with high-dairy diet; however, small sample sizes and limited baseline or change in energy intake information weakened the reports)	Three (null effects)
	Adults	Calcium supplements (with energy restriction)	One (weight loss)	Four (null effects)
Change in body fat	Adults, children, adolescents	Dairy products or calcium supplementation (without energy restriction)	One (greater fat loss in high vs. low dairy consumption in adults)	15 (null effects)
	Adults, children, adolescents	Dairy products or calcium supplements (with energy restriction)	Three (greater fat loss in high dairy vs. low dairy consumption with energy restriction)	Five (null effects)

Author Conclusion:

The current evidence does not support the hypothesis that dairy or calcium consumption alone, or in conjunction with caloric restriction, results in weight or fat loss in the short or long term.

Reviewer Comments:

- *Authors did not describe the range of sample sizes, locations, dosages and other study characteristics for all of the adult clinical trials included in the review*
- *It is hard to fully assess from the review how differences in baseline characteristics of the*

- various study populations may have influenced the outcomes*
- *Focus of studies with energy restriction did not detail trials in healthy weight populations.*

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

1.	Will the answer if true, have a direct bearing on the health of patients?	Yes
2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes
4.	Will the information, if true, require a change in practice?	Yes

Validity Questions

1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search terms used described?	Yes
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	No
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	Yes
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issues considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	???